

Assessment activities in the Trinity River Basin study unit of the National Water-Quality Assessment (NAWQA) Program began in October 1991 with 2 years dedicated to planning, analyzing existing information, and designing data-collection networks. In October 1993, a 3-year intensive data-collection program was initiated. Guidelines were provided by the NAWQA Program National Synthesis team, and suggestions for networks and surveys were made by the study unit's liaison committee. This fact sheet describes the data-collection activities.

Streams

The NAWQA Program characterizes the water quality of streams in terms of water, bed sediments, tissue of aquatic animals, and ecological communities and their habitats. Where possible, the sites in the various networks coincide with each other and are at existing U.S. Geological Survey streamflow-gaging stations so that multiple data sets are available for study and interpretation.

Water

The *basic fixed sites* network consists of 10 sites, 3 on the main stem of the Trinity River and 7 on headwater streams or tributaries. At these sites, basic water properties (temperature, dissolved oxygen, pH, specific conductance) and stream discharge are measured; water samples are collected at least monthly and analyzed for major inorganic ions, nutrients, and sediment concentrations. Sampling at sites in this network began in March 1993 and is scheduled to continue through September 1995.

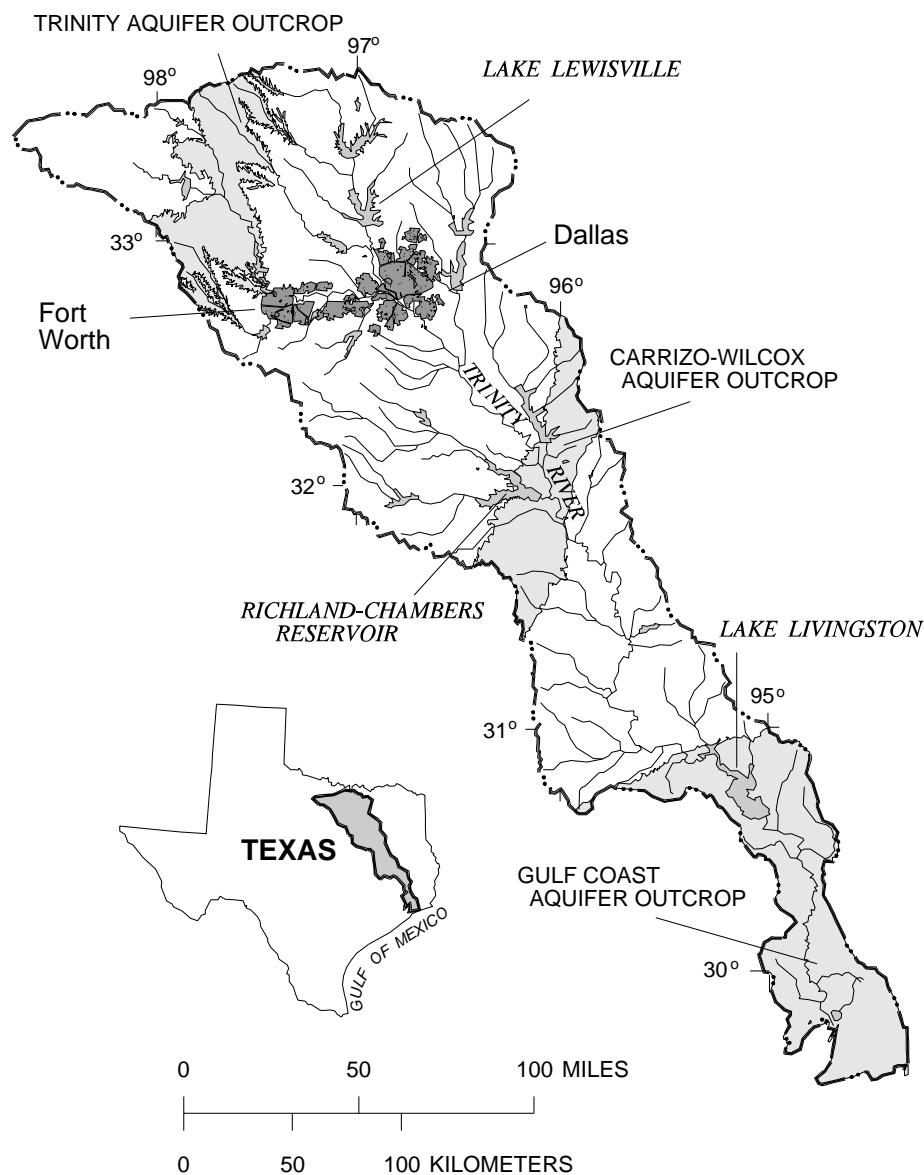
Three *intensive fixed sites*, a subset of the *basic fixed sites*, are sampled for pesticides. The sampling frequency varies from weekly, during the growing season, to monthly during other parts of the year. The sampling continues for a calendar year at each site. One of the sites is on a creek draining a 26-square mile (mi^2) suburban watershed in the Dallas-Fort Worth area, the second is on a creek draining an 807- mi^2 watershed in an intensively farmed area, and the third is on the Trinity River immediately downstream from Dallas and

has a 6,278- mi^2 watershed with rural areas, a major metropolitan area, and numerous reservoirs.

Two *basin-wide synoptic* surveys were conducted in 1994 with the primary objective of determining the water-quality conditions across the basin during stable flow conditions in the winter and during runoff conditions in the spring. The surveys were conducted during 2-week periods and consisted of 43 sites, including the 10 *basic fixed sites*. Five of the sites are on the Trinity River. The other sites are on headwater streams and major tributaries and distributed throughout the basin. Where possi-

ble, a tributary site is located near the midpoint of the tributary and another near its mouth. Field measurements comprised basic water properties and stream discharge. The laboratory analyses included major inorganic ions, nutrients, sediments, and pesticides.

A *Coastal Prairie* survey was designed with the primary objective of determining the concentrations of nutrients and pesticides in streams draining numerous rice, soybean, and grain sorghum farms and cattle ranches near the coast. The survey consists of repeated sampling of three sites for 1 year beginning in March 1994. The



sampling frequency varies from weekly during the growing season to bimonthly during the winter. Field measurements comprised basic water properties and stream discharge. Laboratory analyses include major inorganic ions, nutrients, sediments, and pesticides.

A *Richland-Chambers* survey was designed with the primary objective of determining the level of contamination of streams and a reservoir in a watershed with extensive cotton, grain sorghum, corn, and wheat farms. The survey will be conducted six times between February and June 1995 and will consist of sampling water from five stream sites. Samples will be collected from Richland-Chambers Reservoir at the beginning and end of the survey period. The data will include basic water properties, stream discharge, major inorganic ions, nutrients, sediments, and pesticides.

An *urban point and nonpoint sources* survey was designed with the primary objective of comparing the concentrations of urban runoff and effluent from wastewater treatment plants. Six such surveys are planned between February and June 1995. The sampling network consists of six stream sites and three wastewater treatment-plant outfalls. The data set will include basic water properties, discharge, major inorganic ions, nutrients, sediments, and pesticides.

Bed Sediment and Tissue

An *occurrence and distribution* survey was designed with the primary objective of determining the contamination in very fine grained bed sediments and in tissue of invertebrates or bottom-feeding fish. The sites were sampled in the fall of 1992 and consisted of the *basic fixed sites* and several sites in the urban area where contamination would be most likely. The laboratory analyses consisted of metals, polychlorinated biphenyls (PCB's), polynuclear aromatic hydrocarbons (PAH's), and organochlorine pesticides.

A *trends* network has been established wherein bed sediments and tissue are sampled every few years to determine long-term changes in metals, PCB's, PAH's, and organochlorine pesticides.

An *impact of wastewater effluent* survey was designed with the primary objective of comparing several contaminant concentrations in streams above and below outfalls of major wastewater treatment plants

and in nearby urban streams. The survey was conducted during the fall of 1994 and consisted of sampling areas near three wastewater outfalls. The laboratory analyses consisted of metals, PCB's, PAH's, and organochlorine pesticides.

A *Richland-Chambers* survey was designed to support the water survey in the same area that was described earlier. Each of the five stream sites will be sampled once. The laboratory analyses consist of metals and organochlorine pesticides.

Semipermeable Membrane Device (SPMD) research has been conducted to determine the utility of SPMD's in measuring, under controlled conditions, the occurrence and concentration of PCB's and PAH's in water. To compare results from a SPMD with native organisms, caged clams were deployed with the SPMD and subjected to the same laboratory analyses. This research was conducted in the summer of 1994 at three stream sites.

Ecological Communities

At the *basic fixed sites* and two additional Trinity River sites downstream of Dallas, community surveys of fish, invertebrates, and algae have the primary objective of relating the communities to long-term water-quality conditions. The surveys are conducted during the summer of each year. In addition to the community surveys, the habitat is characterized once at each site.

Reservoirs

A *water and sediment* survey of Soil Conservation Service reservoirs was designed with the primary objective of determining the water and sediment quality in small headwater streams. The survey will consist of sampling about eight reservoirs in watersheds of Richland-Chambers Reservoir once during June and July 1995. Water-sample analyses will include basic water properties, major inorganic ions, nutrients, and pesticides. Reservoir sediment will be sampled and analyzed for pesticides.

Research on *water-quality trends using sediment cores from reservoirs* has been conducted to explore the possibility of identifying relations between sediment chemistry and known changes in sources or availability of contaminants. Three sediment cores were extracted from Lake Livingston in the fall of 1992. One core

was collected from a lake northeast of downtown Dallas in the summer of 1994.

Aquifers

Study-unit surveys of ground water have been conducted with the primary purpose of improving the definition of ground-water quality, especially the concentrations of metals, volatile organic compounds, and pesticides, in important aquifers. Water samples were collected from wells in the outcrop areas of the major aquifers in the study unit—the Trinity, Carrizo-Wilcox, and Gulf Coast aquifers. About 25 wells, with an emphasis on those open to the shallowest saturated zone, were sampled in each aquifer. About 15 to 20 percent of the wells are used for public supply. The sampling was conducted in 1994 and included basic water properties and laboratory analyses for major inorganic ions, nutrients, metals, volatile organic compounds, and pesticides.

An *urban shallow ground-water* study was designed with the primary objective of determining if the shallow ground water in a suburban watershed is contaminated with nutrients, pesticides, and volatile organic compounds. The study consisted of installing and sampling 28 monitoring wells at 20 sites and sampling 10 existing (deeper) wells. The sampling was conducted in the summer of 1993. Laboratory analyses included major inorganic ions, nutrients, metals, volatile organic compounds, pesticides, and tritium.

A *flowpath* study was designed with the primary objective of determining the interaction between a shallow aquifer and small streams in a suburban area. The study consists of three sites where monitoring wells are near small perennial streams. The monitoring wells are also part of the *urban shallow ground-water* study. The sampling of the 3 streams and 10 wells was conducted in 1993–94 and will be conducted again in 1995. Water-quality analyses included major inorganic ions, nutrients, and pesticides.

—Larry F. Land

Information on technical reports and hydrologic data related to the NAWQA Program can be obtained from:

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